

#3

For: SIGNAL MONITORING



P07052US00/RFH

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# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

14 AUG 2000

1. Your reference IS/BP5871736

14 AUG 2000

2. Patent application number  
(The Patent Office will fill in this part)

0019984.4

15AUG00 E560770-1 D02823  
001/7700 0.00-0019984.4

3. Full name, address and postcode of the or of each applicant (underline all surnames)

CHESILVALE ELECTRONICS LTD  
MAESGLAS INDUSTRIAL ESTATE  
UNIT 3  
NEWPORT  
GWENT

Patents ADP number (if you know it)

6125983001

If the applicant is a corporate body, give the country/state of its incorporation

GB

4. Title of the invention

SIGNAL MONITORING

5. Name of your agent (if you have one)

MEWBURN ELLIS

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

YORK HOUSE  
23 KINGSWAY  
LONDON  
WC2B 6HP

Patents ADP number (if you know it)

109006

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

# Patents Form 1/77

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Continuation sheets of this form 0

Description 8

Claim(s) 0

Abstract 0

Drawing(s) 2 + 2 *8w*

10. If you are also filing any of the following, state

Priority documents 0

Translations of priority documents 0

Statement of inventorship and right 0

Request for preliminary examination 0

Request for substantive examination 0  
(Patents Form 10/77)

Any other documents 0  
(Please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature

Date

11 August 2000

12. Name and daytime telephone number of person to contact in the United Kingdom IAN STUART 0117 926 6411

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SIGNAL MONITORING

The present invention concerns apparatus and methods for the monitoring of signals. It is particularly  
5 concerned with the monitoring of signals having both audio frequency and/or other analogue components, and components of a different character, e.g. out-of-band components, digital components and high voltage components. (These categories are not mutually  
10 exclusive). It is mainly concerned with signals transmitted over conductors, e.g. telephone lines.

An engineer typically monitors a line by connecting a test telephone and listening for an audio signal. If he hears nothing he may assume that there is no signal  
15 there. However a simple test telephone might not reveal the presence of signals other than audio signals. Thus the engineer might work on a line, unaware that he is disrupting non-audio signals such as digital traffic.

Telephone lines sometimes carry high voltages, e.g.  
20 for powering active circuits in a local distribution network. This can lead to damage to a test telephone, and possibly to injury to the engineer.

There are now some more sophisticated test telephones which can provide detection of some non-audio  
25 signals, particularly digital signals. For example,

Chesilvale Electronics Ltd produces a range of test telephones under the trademark DIGALERT.

Fig 1 is a schematic circuit diagram of the DIGALERT 360 test telephone. It has input terminals 1, 3 for connection to a line to be tested. The terminals 1, 3 are connected to telephone circuitry 5 via a switch 7. Normally the switch is open (the telephone is on-hook). The impedance of the switch 7 is then so great that the circuitry 5 is not exposed to voltages between the input terminals 1, 3. However, when the switch 7 is closed (the telephone is off-hook) the circuitry 5 is connected between the input terminals 1, 3. The telephone further includes a sensor 9 for detecting DC voltages between the input terminals 1, 3 above a first predetermined level. It also includes a sensor 11 for detecting that the DC voltage between the input terminals 1, 3 is below a second predetermined level. It further includes a digital signal detector 13 for detecting digital voltage signals between the terminals 1, 3. Upon the sensors 9, 11 detecting that the DC voltage is outside an acceptable range (i.e. there is an under-voltage or an over-voltage), or upon the digital signal detector 13 detecting that a digital signal is present between the input terminals 1, 3, a signal is transmitted to a microcontroller 15. The microcontroller 15 opens the



switch 7 if it is closed and in any case prevents its closure, so that the telephone circuitry is electrically disconnected from the input terminals 1, 3. The microprocessor 15 further triggers the generation of an alarm tone by a sound generator 17 (which may or may not be the same as a sound generator of the telephone circuitry 5).

We have now appreciated that (a) the operation of monitoring a signal carrier can usefully employ a computer, particularly a personal computer ('PC') such as a Laptop or a palmtop; and (b) monitoring can be carried out remotely, e.g. using a wireless link.

Thus broadly, in one aspect, the invention arises from the realisation that a computer can be used for many of the functions of a conventional test telephone, particularly if the computer is portable. Thus the invention provides a system in which a computer is coupled to a data gathering means which is adapted to be coupled to a data carrier, particularly a telephone line. The data gathering means can gather data from the carrier and/or carry out tests, and can transmit data to the computer. In this aspect the invention provides a system comprising:

(a) signal analysing circuitry having an input for receiving a signal from a carrier, said circuitry

being operable to detect the presence of a predetermined type or types of signal or other traffic, e.g. a non-audio component (e.g. a digital signal, an out of band signal or a high voltage); and

- 5                   (b) a PC coupled to the signal analysing circuitry to receive an output therefrom.

The signal analysing circuitry may be arranged to output a signal only when it does not detect a signal or component of a predetermined type. Its output may be the  
10 signal as received from the carrier or a modified version thereof.

The signal analysing circuitry may be provided on an element such as a card that can be removably plugged into a port of the PC to effect said coupling. Alternatively  
15 it may be remote from the PC and coupled to it indirectly, e.g. via a radio link. Possible modes of coupling to the computer include USB, serial, PCMCIA, wireless, and via a cellular telephone system.

The system will usually include a loudspeaker or  
20 headset for rendering audible any audio component. This may be connected to the normal audio output coupling of the PC, or to an output coupling provided on the element bearing the signal analysing circuitry. Likewise there may be a microphone, so that the system can be used as a  
25 telephone for communicating over the carrier. This too

may be provided on the PC or connected to the element,  
e.g. as part of a generally conventional handset.

In a second aspect, broadly, the invention relates  
to the use of a wireless link for transmitting data from  
5 a data gathering or testing device which is coupled to a  
data carrier, to a monitoring device which may be a test  
telephone or a computer.

Thus we may provide a system comprising:

- (a) A monitoring device, e.g. a computer;
- 10 (b) Wireless receiver means coupled to the device  
to provide an input thereto, said receiver means being  
adapted to receive a data-carrying wireless signal and to  
derive data therefrom to provide a said input;
- (c) Remote data gathering and wireless transmitting  
15 means adapted to be coupled to a data carrier  
(particularly a telephone line, which may be elevated  
e.g. by means of telegraph poles, or buried) and adapted  
to derive data from the carrier and transmit it to the  
receiver.

20 The remote data gathering means may be adapted to  
perform a test on the data carrier (or on the signal  
carried thereby). For example, it may be operable to  
detect the presence of a predetermined type or types of  
signal or other traffic (e.g. a non-audio component such  
25 as a digital signal, an out-of-band signal or a high

voltage). Thus the data transmitted to the receiver means may comprise test data.

The data transmitted to the receiver means may comprise all or part of a signal carried by the carrier.

5 The computer may supply all or some of the functions of a conventional test telephone.

An embodiment of the invention may embody both of the above aspects.

10 In another aspect the invention provides a method of monitoring a signal on a carrier using a system as described above.

Some embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

15 Fig 1 is a schematic circuit diagram of a known test telephone;

Fig 2 is a schematic diagram of an embodiment of the invention; and

20 Fig 3 is a schematic diagram of a second embodiment which employs a radio link.

Referring to Fig 2, this shows a laptop PC 100 having a card 102 plugged into a port. A pair of connectors 104 extend from the card 102. They terminate in clips 106 for connection to a pair of telephone wires.

25 Fig 2 shows two alternative ways of providing

telephone functions. The card 102 may be coupled (or capable of being coupled) to a loudspeaker and microphone, e.g. provided by a telephone handset 108. The PC may be adapted to be coupled to a headset 110.

5           The card 102 may have circuitry corresponding to all or part of that shown within the box 120 in Fig 1, the terminals 1, 3 of Fig 1 corresponding to the connection 104 of Fig 2.

10           Of course, once the computer 100 is coupled to a telephone line, it can be used to carry out a variety of operations including performing tests on the line, analysing and/or displaying data received from the line, and transmitting and receiving data in various formats.

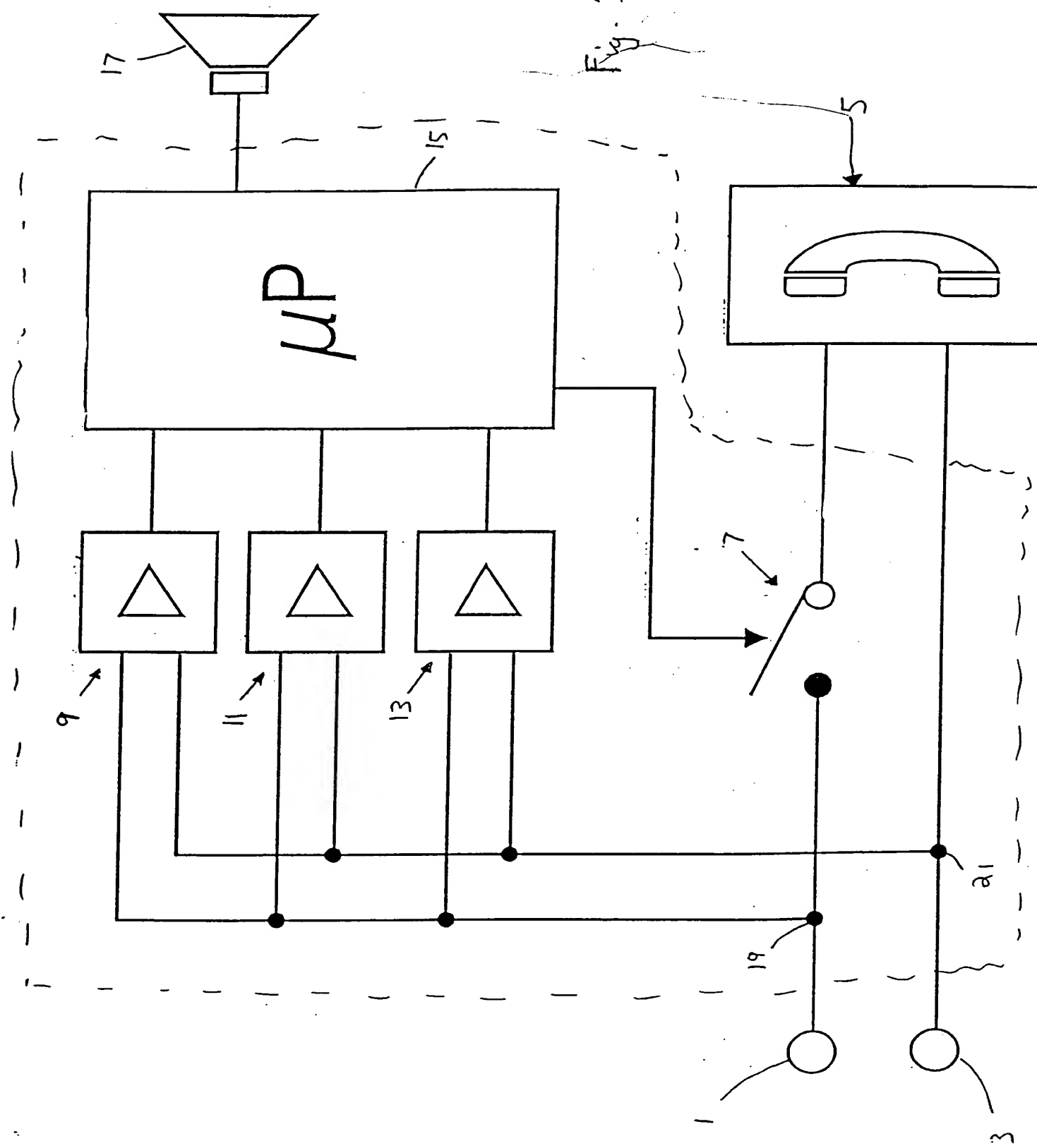
15           Fig 3 shows an alternative mode of coupling the analysing circuitry to the PC. In this case the circuitry is mounted in a box 200 fixed to a telegraph pole 202. Leads 204 couple a telephone line to the circuitry. The output of the circuitry is transmitted from an aerial 206 as an RF signal. This is receivable  
20           by a receiving aerial 208 which may be mounted on a van 210 housing a PC 212.

25           In the illustrated examples, a computer is used to provide telephone-type functions. Of course it may provide other functions as well or instead. For example it may be set up to handle digital signals, in which case

- 8 -

the signal processing circuitry would not block the outputting of digital signals. The circuitry may include a digital modem.

Fig. 1



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Fig 2

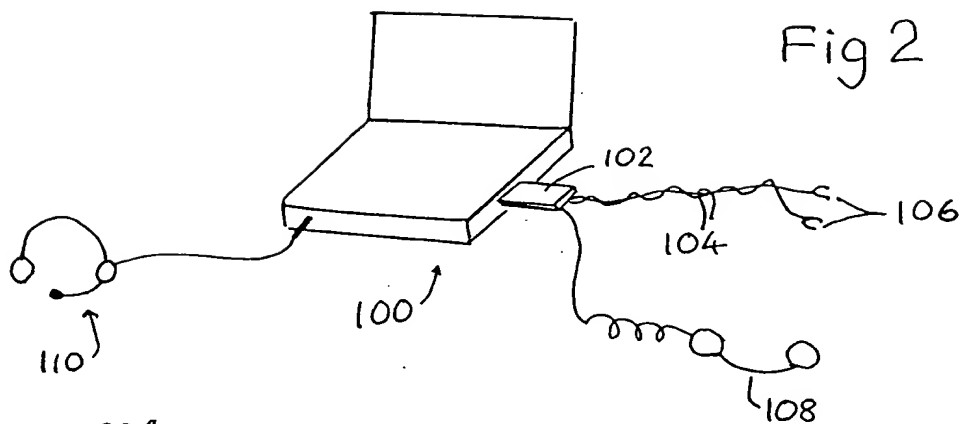
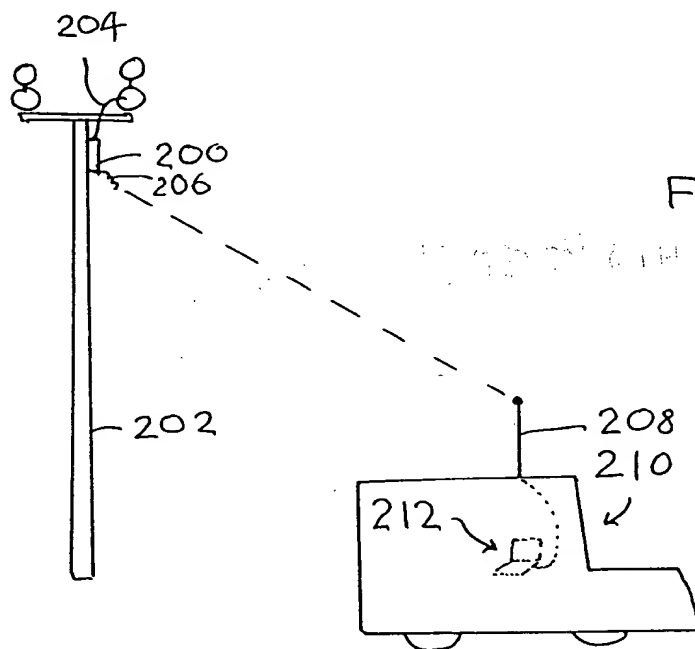


Fig 3



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